



The Moth: where club flying began

From the DH 60 Cirrus Moth of 1925 to the DH 82 Tiger Moth of 1932, de Havilland's open cockpit tandem two-seat biplanes set the club movement on course, while the later machine provided the RAF with arguably the most successful trainer of all time. By **David Ogilvy**



Although people had been involved with the private side of flying since the very earliest days, before World War 1, it all began to come together in 1925 when, in an attempt to make the nation more air-minded, the Air Ministry sponsored the opening of, and the equipment for, five geographically spread flying clubs. Types previously available were surplus military machines that were not economically suitable for the task. Among the first DH 60 Moths to be delivered from the de

Havilland factory at Stag Lane was G-EBLV, which went to the Lancashire Aero Club; fortunately both that aeroplane and the club remain alive and well today. Other recipients of the new aeroplanes were the Midland Aero Club, Newcastle Aero Club, the Yorkshire Aeroplane Club and, not surprisingly, de Havilland's own London Aeroplane Club. These were Cirrus Moths, with the four-cylinder upright engine developing only 60 bhp.

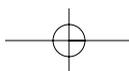
The DH 60 Moth

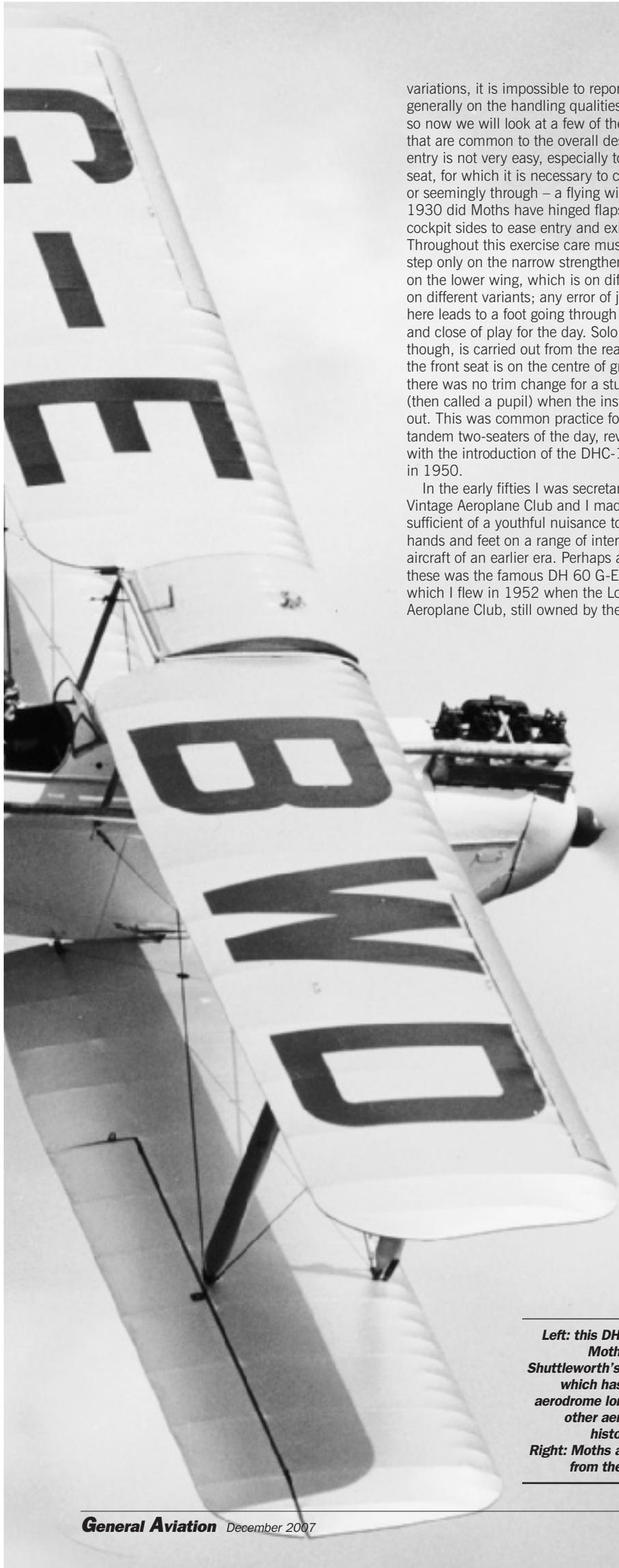
There were several variants of the basic design and, during its development, the available power output ranged from 60 hp in the earliest models to more than twice that figure in the last – the Moth Major – with eight different engines and a time spread of seven years between the initial flights of first and final variants. So there were many Moths, in both character and production: 2112 DH 60s were built between 1925 and 1934. With all these



Mike Jeram

Left: one of the original DH 60 Cirrus Moths
Above: the same aircraft today, with the solid axle and large thin wheels with high pressure tyres clearly showing





variations, it is impossible to report more than generally on the handling qualities of the type, so now we will look at a few of the features that are common to the overall design. Firstly, entry is not very easy, especially to the front seat, for which it is necessary to climb over – or seemingly through – a flying wire. Not until 1930 did Moths have hinged flaps on the cockpit sides to ease entry and exit. Throughout this exercise care must be taken to step only on the narrow strengthened walkway on the lower wing, which is on different sides on different variants; any error of judgement here leads to a foot going through the fabric and close of play for the day. Solo flying, though, is carried out from the rear cockpit, as the front seat is on the centre of gravity, so there was no trim change for a student pilot (then called a pupil) when the instructor got out. This was common practice for almost all tandem two-seaters of the day, reversed only with the introduction of the DHC-1 Chipmunk in 1950.

In the early fifties I was secretary of the Vintage Aeroplane Club and I made myself sufficient of a youthful nuisance to get my hands and feet on a range of interesting light aircraft of an earlier era. Perhaps a key among these was the famous DH 60 G-EBLV of 1925 which I flew in 1952 when the London Aeroplane Club, still owned by the de

Havilland Aircraft Company, operated from Panshanger. With a maximum weight of only 1240 lbs – 600 lbs lighter than a Tiger Moth on which I had trained and subsequently had flown on many occasions – the difference was very marked, as was the much lower power. However, perhaps the feature that hit me most – literally – was the very hard undercarriage with a straight-through axle and large thin wheels with high pressure (40 lbs/sq in) tyres which, on later Moths, gave way to a more tolerant split unit with wheels of smaller diameter and lower tyre pressure. Certainly the earliest Moths knew how to bounce on an imprecisely judged landing and I admit to experiencing this at first-hand.

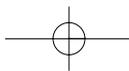
At the other end of the range was the Moth Major, powered by the 130 hp Gipsy Major that became ubiquitous among light aircraft of the thirties. Because of its light structural weight, this climbed at almost 900 feet a minute (more than double the rate for the original Cirrus Moth) and was slightly faster on the level than its mass-produced successor the DH 82 Tiger Moth, about which more detail appears later. It felt pleasantly overpowered and, because of its higher operating speed, had a tighter feel to the controls – especially the ailerons. The only example to survive World War II was G-ADHE, which I had the pleasure to fly several times and nagged the owner to let me use to compete in the 1952 Southend Trophy Air Race, much of the time humbly neck and neck with the late Neville Duke in the Hawker Tomtit G-AFTA. Rightly, I feel, he beat me to the finishing post. Although 'HE no longer lives, fortunately an imported example does so today and another, G-ACNE, has been rebuilt.

Clearly there is insufficient space to provide detailed handling reports on all the DH 60s, so I have selected one in the middle of the range: the DH 60X Hermes Moth, using G-EBWD as the test case. Built in 1928 as a Cirrus Moth, 'WD became Richard Shuttleworth's first aeroplane and, sensibly, he converted it to a Hermes of 105 hp. With this and the much improved split axle undercarriage (hence the 'X' designation), 'WD was (and, fortunately, is) a delightful aeroplane to fly. However, we must put first things first.

The cockpit is small, both in width and length. It is very much more cramped than



Left: this DH 60X Hermes Moth was Richard Shuttleworth's first aircraft, which has lived on one aerodrome longer than any other aeroplane in the history of aviation
Right: Moths are flown solo from the rear cockpit



that of the later Tiger Moth. There is insufficient room to put a worthwhile cushion behind one's back and still have the stick and instruments sufficiently far ahead for comfort. However, this is a petty penalty to pay for a machine with so many virtues.

An uncluttered panel, or dashboard as it would have been called, contains essentials only: an airspeed indicator graduated from 40 mph to (optimistically) 160 mph, rpm and oil pressure gauges, a cross-level and a non-sensitive altimeter complete the picture. An early P-type compass graces the floor, while a generous rear hatch holds sufficient kit to make 'away matches' practicable. The person in the front is allowed to read height and speed only, but has the added benefit of a large clock with which to criticise the pilot for failing to reach his destination on time!

During and after the hand-swing start, the pilot is treated to visual entertainment, as the moving rockers and valves of the uncowed upright engine are exposed for all to see, and these can generate an almost hypnotic effect. Unlike the earliest splash-fed Cirrus engine which offered about 5 lb of oil pressure, the Hermes operates at a more comforting figure and jumps to about 60 lb after starting, settling to an average of 38 lb – 42 lb in normal flight. It produces a unique sound, with a series of rapid hollow 'pops' from the end of the long pipe, which runs along the right side of the fuselage and can burn an unwarily misplaced hand.

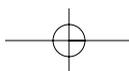
Taxying calls for a touch of the fast-dying traditional skill. Unlike the later Tiger with its steerable skid connected to the rudder, the pure Moth has a fixed skid attached rigidly to the bottom of the sternpost. This offers little help in negotiating corners, for which generous rudder accompanied by careful bursts of engine may need to be supported by the use of appropriate aileron and, on windy days, a wing walker.

The take-off is most satisfying, for the Hermes Moth's weight/power ratio is good, and after an immediate tail-rise it is airborne more rapidly than most other conventional light biplanes. It is impossible to record a precise unstick figure, as the ASI comes to registered life at 40, but I am convinced that G-EBWD takes little persuasion to fly happily at about five miles an hour below this.

One of the first tests for any type is to check its conduct at the stall. If it shows unhappy qualities at the low end of the speed scale this serves as a warning, calling for added caution, but the Moth emerges with an entirely clean health record. In fact, there is little to report except to state the expected: the ailerons



Above: Richard Shuttleworth's DH 60X Hermes Moth taxis out at Old Warden
Below: to enjoy the purest pleasures of flight just for the sake of flying, the Moth is hard to beat
Bottom: three early DH 60s: in the lead is the 1925 Cirrus Moth with the 1928 Hermes Moth G-EBWD and 1929 Gipsy Moth G-ABAG



become as sloppy as one would anticipate, there is a lot of waffling and wallowing, and eventually the nose drops (at a speed below the lowest ASI graduation) in an unhurried manner. With the usual variations and a few built-in tricks, a wing can be persuaded to go down, often to the tuneful accompaniment of a whistling in one or more of the wires. At this stage any minor irregularities in the rigging make themselves seen, heard or felt – sometimes all three. But the machine behaves impeccably.

What is the Moth really like? Although very capable of serving a fully functional purpose and with some very long, famous historic flights to the type's credit, it is in another sphere that it really shines. To enjoy the purest pleasures of flight just for the sake of flying, the Moth is hard to beat. The ingredients must be available and the time must be right, but let us choose a calm, clear June evening, about an hour before dusk, and with nowhere particular to go. With the Hermes throttled back to provide a gentle 1500 rpm (the data plate quotes 1900 as normal) and the ASI offering a little less than 70 to match, I will leave the rest to the imagination of the reader, except to add one personal point: to gain the full rewards of such a situation, this needs to be a solo affair and an empty front cockpit adds a certain flavour to the scene. That may sound ungraciously unsociable, but there is something special about flying alone and many pilots will understand what I mean.

In general, handling the straight-winged DH 60 Moth is quite different from its successor, the Tiger. The earlier machine has a more taut feel, especially to the ailerons, which are a little heavier (offering more resistance to roll) than those of the DH 82a, but are totally lacking in the latter's slight slop. Certainly the Tiger is more manageable in rough weather, when its additional weight and higher wing loading must help.

Clearly, a biplane with all the usual array of struts, flying and landing wires and other excrescences that make it what it is, will not gain much performance on the level with power increase, but a bigger engine offers positive benefits in the rate of climb. Although I am writing primarily about the Hermes-engined G-EBWD, a direct speed comparison between the first and the last of the DH 60 series brings home the point: the original 60 hp Moth claimed a book maximum of 91 mph while the later Moth Major, with its 130 hp, offered 112 mph – or roughly a twenty per cent improvement from a 100+ per cent power increase. This means, of course, that 'WD is little faster now than it was when built with a Cirrus, but its get-up-and-go climb performance (it clocks more than 650 feet a minute) vastly improves its overall qualities as a flying machine. It loops very neatly and can be flown all the way round positively from about 110 mph, but it does not invite manoeuvres in roll.

Moths lived at the peak of the era of side-slipping, which provides the most effective way of killing surplus height on the approach. The Moth slips well, which is a useful facet as its normal glide is far from steep. Crossing the boundary fence at about 55 mph IAS sets up 'WD nicely for a steady hold-off. With the earlier large wheels, high-pressure tyres, and straight axle undercarriage, the Moth bounced energetically after only a minor misjudgement, but the later system is more tolerant. Nevertheless, if one must err – and who doesn't? – it is advisable to round-out a little early; the subsequent drop on to three points is far less embarrassing than the bounce that is given free of charge in exchange for a slightly premature touchdown during the hold-off. The rudder remains moderately effective almost to the end of the landing run, but although the fixed skid helps to provide braking, out-of-wind landings should be avoided if possible.

DH 82 Tiger Moth

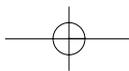
The final product in this line was the DH 82 (later DH 82a) Tiger Moth, which became by far the most widely known member of the genre, on which perhaps more British pilots have trained than on any other type. 4200 were built in England, initially by de Havilland at Hatfield, but wartime pressure on production of the DH 98 Mosquito caused a move for the majority to be made by Morris Motors at Cowley, near Oxford. Tiger Moths were made also in Canada (including a version with enclosed cockpit, tailwheel and brakes) and Australia, bringing the total to about 7150. It was 'beefier' than the DH 60s, with a metal fuselage frame and staggered wings to ease baling out by parachute. It used the ubiquitous and solidly reliable DH Gipsy Major engine.

Although Tigers (as they were usually known) have earned their fuel and oil in both civil and military roles, it is in the latter that they were numerically strongest. An RAF Elementary Flying Training School of the forties would be based on a relatively small all-grass aerodrome where a need for sound airmanship and discipline were essential ingredients. There was no radio or air traffic control, usually with just a watch office with one person ready to press the crash button in the event of an accident or serious incident. Fifteen to twenty machines in the circuit were regular occurrences, especially just before NAAFI break!

Although most Service pilots who trained on Tigers – including the author – would progress immediately afterwards to monoplanes with flaps and retractable undercarriages, the

Below: the most numerous and well-known of all the Moths, the Gipsy-Major powered DH 82a Tiger Moth served with the RAF from 1932 until 1952





'biplane effect' provided many thousands of pilots with the experience of practical basic airmanship that was never wasted. The Tiger was not easy to fly accurately and quickly it revealed any shortcomings in a person's co-ordination of eyes, hands and feet. For this reason it proved ideal for pilot grading, when a short course of 12 hours sorted sheep from goats before those who passed that stage would begin training in earnest.

As with almost all Service trainers, including the Magister, Chipmunk, Prentice, Provost et al, the Tiger revealed that it could be reluctant to recover from a spin, so a modification incorporating strakes on the fuselage sides just ahead of the tailplane, was introduced to rectify this weakness. Whilst many years ago spinning was removed from the syllabus for the PPL, it has always been an essential component in a Service pilot's course.

The Tiger Moth has always been a much-loved aeroplane, with many devoted owners caring for their valuable machines. It is a delight to fly, with relatively little draught in the

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front cockpit (where it is possible, but unwise, to fly without goggles) and rather more for the occupant of the rear seat. With a cruise speed of about 85mph at 1900 rpm it can take a long time to reach an upwind destination, but that misses the main point: flying it for flying's sake. Balanced flight calls for active use of all controls, especially the rudder, and keeping the top needle of the turn-and-slip indicator anywhere near the centre can be an exercise in itself. For those who wish to indulge in the act of aerobatics, the Tiger is cleared for all normal manoeuvres; the genuine slow roll requires the full biplane treatment with, again, generous rations of rudder. However, for those who wish to remain relatively upright, there is no shortage of either pleasure or challenge.

Like its predecessor, the DH 60, the Tiger Moth has played a key role in the world of club and private flying. Shortly after World War 2, an 'as-is' machine in fly-away condition could be bought from the Air Ministry for £50, whilst any flying training organisation that was a member of the Association of British Aero Clubs and Centres (a predecessor of AOPA) could acquire one for the concession price of £25. Not surprisingly, therefore, there were a lot of them about. Fortunately, for anyone who wishes to master (or attempt to master) the intricacies of pure flight, Tigers remain available today at Cambridge Flying Group and Northamptonshire School of Flying at Sibson. Try it. Give yourself a treat – and a challenge. ■

Damien Burke

